

REMARKS

Claims 13-24 were rejected. Claims 13, 15, and 20 have been amended. Claims 13-24 are now pending. The above amendments and the following remarks are considered by Applicants to overcome each rejection raised by the Examiner and to place the application in condition for allowance.

Rejections of claims 13-15, 17-22, and 24 pursuant to 35 U.S.C. § 102(b)

The Examiner rejected claims 13-15, 17-22, and 24 pursuant to 35 U.S.C. § 102(b) as being anticipated by U.S. Pat. No. 4,697,908 to Ogihara, et al. (“Ogihara”).

Ogihara is directed to an adjustable shutter mechanism by which a diaphragm opening can be opened or closed by moving at least one sector-shaped shutter element, wherein different intermediate adjustments can also be realized. The movement of the sector-shaped shutter element is carried out by changing the direction of movement of a stepper motor. A control unit determines the quantity of required steps, controls the pulse generator for generating the control pulses for the stepper motor, and monitors the achieved movement by a step counter.

Ogihara, however, does not disclose “a shutter element which is *fastened directly* to the motor shaft of the stepper motor,” as required by amended claim 13 (emphasis added). Ogihara’s shutter element is not fastened directly to the motor shaft, but is driven by gear unit elements (reference numbers 19, 20, and 15c in Figure 2). Proceeding from the pinion 31 located on the motor shaft 30, the movement of the shutter element 14 is caused by the toothed rings 19 and 20 and the pin 15b engaging the toothed ring 15c. (*See* Ogihara, column 2:56-65; Figure 2a.)

It is not possible to actuate Ogihara’s shutter element in this way by a simple field rotation of the stepper motor. A series of steps of the motor is necessary to achieve a closed or opened state of the aperture. Such a series of steps corresponds to the problem to be solved by Ogihara. Ogihara’s adjustable shutter mechanism is not designed to realize only an “open” or “closed” state, but intermediate positions as well.

Further, Ogihara does not disclose movement of shutter element such that “a 180 degree rotation of the *electromagnetic field* occurs in a stator of the stepper motor,” as also required by amended claim 13. The Examiner cites column 4:40-64 of Ogihara with regard to this limitation. That portion of Ogihara states that the two phases are displaced relative to one another by 180 degrees. The 180 degrees of claim 13, however, does not refer to phase displacement between individual windings, but to a reversal of the direction of the *electromagnetic field*, which results in a rotation of the motor shaft by n full steps and a movement of the shutter between “open” and “closed” states. For these reasons, Ogihara does not disclose at least two significant limitations of amended independent claim 13.

Regarding claim 14, the Examiner contends that Figures 1-2 of Ogihara disclose “a two-phase stepper motor with a claw-pole construction of the rotor and stator is used.” These Figures, however, do not show a claw-pole construction for the stepper motor.

Regarding claims 15 and 20 (now amended), the Examiner contends that Ogihara discloses that “the movement of the shutter element is limited to a movement range of less than two full steps by a stop pin in the two end positions, respectively.” The Examiner contends that Ogihara’s stops serve to limit the movement range to less than n full steps. In Ogihara, the stops in the form of pin 16 limit the movement range of the toothed ring 15 and accordingly are end stops for the shutter. Their function, however, is limited. The quantity of full steps between the two stops is rather large because of the multiplication of the gear unit elements, but in no case is it in the range of only two full steps, as required by amended claims 15 and 20. Thus, Ogihara cannot disclose shutter movement limited to a range less than two full steps by a stop pin in the two end positions.

Finally, regarding claim 19, the cited portions of Ogihara (column 4:40-64) do not disclose a retarded or time-delayed reversal of the current direction in the individual windings of the stepper motor carried out by the control unit for directed movement of the shutter element.

For these reasons, Ogihara does not disclose each limitation of independent claim 13 or its dependent claims. Accordingly, Applicants respectfully request withdrawal of the rejections issued pursuant to 35 U.S.C. 102(b).

Rejections of claims 16 and 23 pursuant to 35 U.S.C. § 103

The Examiner rejected claims 16 and 23 pursuant to 35 U.S.C. § 103 as being unpatentable over Ogihara as applied to claims 1 and 17 above, and further in view of U.S. Pat. No. 6,466,353 to Tuchman (“Tuchman”).

Applicants respectfully submit that claims 16 and 23 are not obvious because, as discussed above, Ogihara does not disclose (1) “a shutter element which is fastened directly to the motor shaft of the stepper or motor,” or (2) movement of shutter element such that “a 180 degree rotation of the electromagnetic field occurs in a stator of the stepper motor,” these limitations both being required by amended independent claim 13. Thus, Ogihara, applied to claim 1 above, does not disclose at least two significant limitations of the independent claim. Further, it would not have been obvious to add those teachings to the teachings of Ogihara, and the Examiner does not argue to the contrary. Thus, independent claim 1 would not have been obvious to one of ordinary skill in the art, and therefore dependent claims 16 and 23 would also not have been obvious.

Regarding the added limitations of dependent claims 16 and 23, the Examiner concedes that Ogihara does not disclose these limitations, but contends that Tuchman cures Ogihara’s deficiencies. Generally, Tuchman discloses an optical shutter comprising a frame with an aperture and shutter blade for modulating a light beam or a particle stream passing through the aperture.

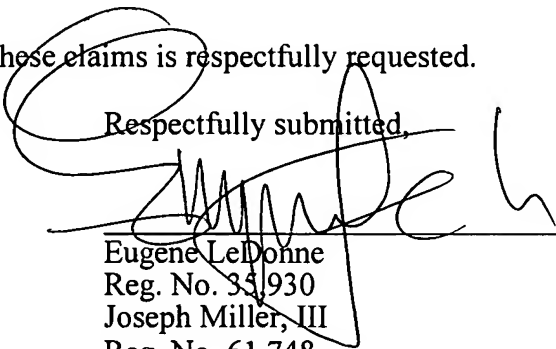
Regarding claim 16, the Examiner contends that Tuchman discloses at column 5:13-16 “an end-position sensor which is fastened to the mounting unit and determines the position of the shutter element.” The text of Tuchman cited by the Examiner, however, describes a signal (monitor output) that is emitted by the control circuit 36. This can only be determined based on the actual supply of current to the phases. A mechanical malfunction cannot be determined. Claim 16 requires end-position sensors for this purpose which detect the actual position of the shutter. Tuchman does not describe such an end-position sensor.

Regarding claim 23, the Examiner contends that Tuchman discloses that “the closing of the diaphragm aperture by the shutter element is ensured when the optical device is put into operation by evaluating the signal of the end-position sensor.” But as stated above, Tuchman describes a signal (monitor output) that is emitted by the control circuit 36. This can only be determined on the basis of the actual current supply to the phases. A mechanical malfunction cannot be determined. Like claim 16, claim 23 requires end-position sensors for this purpose which detect the actual position of the shutter. Tuchman does not describe such an end-position sensor.

For these reasons, even if the teachings of Ogihara and Tuchman were combined, one would not arrive at the inventions of claims 16 and 23. Further, it would not have been obvious to one of ordinary skill in the art to add these teachings to the teachings Ogihara and Tuchman, and the Examiner does not argue to the contrary. Accordingly, Applicants respectfully request withdrawal of the rejection.

An early action on the merits of these claims is respectfully requested.

Respectfully submitted,



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